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Claim 46 (new): The method of claim 44 wherein the luminescent biological agent is *Vibrio fischeri* (ATCC Acc. No. 7744).

Claim 47 (new): The method of claim 42 wherein the luminescent biological agent is selected from the group consisting of a luminescent bacteria, a luminescent fungi, a luminescent firefly extract, a luminescent anthozoan, a luminescent earthworm extract, a luminescent coelenterate extract and a luminescent crustacean.

Claim 48 (new): The method of claim 42 wherein the luminescent biological agent comprises a luminescent cell.

Claim 49 (new): The method of claim 42 wherein the luminescent biological agent comprises a genetically modified luminescent biological agent.

Claim 50 (new): The method of claim 49 wherein the genetically modified luminescent biological agent comprises an organism genetically engineered to include a luciferase gene.

Claim ⁵¹~~50~~ (new): The method of claim 42 wherein the separation phase matrix is high performance liquid chromatography and the test sample is a soluble sample.

Claim ⁵²~~51~~ (new): The method of claim 42 wherein identifying further comprises photography.

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Claim ~~52~~ (new): A method for chemically identifying a toxic substance in a sample using a luminescent biological agent, said method comprising the steps of:

- preparing a luminescent biological agent for use in conjunction with chromatography paper;
- obtaining a sufficient volume of the sample suspected to contain toxic substances to provide a test sample;
- separating the toxic substances of the test sample on a separation phase matrix to provide a first set of serial aliquot volumes;
- exposing said first set of serial aliquot volumes to said luminescent biological agent by spotting said serial aliquot volumes in an array or in a linear fashion on a sheet of chromatography paper and spraying said sheet with a suspension of luminescent biological agent;
- identifying the presence of said toxic substances in said first set of serial aliquot volumes by zones of luminescent inhibition on said chromatography paper;
- obtaining a second volume of the sample to form a second test sample;
- separating the toxic substances of the second test sample on another separation phase matrix to provide a second set of serial aliquot volumes; and
- determining the chemical identity of a separated toxic substance observed at areas of luminescent inhibition with said first set of serial aliquot volumes by analyzing a corresponding inhibition region with said second set of serial aliquot volumes.

54
Claim ~~53~~ (new): The method of claim ~~52~~ wherein the luminescent biological agent is a luminescent bacteria.

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Claim ~~54~~ (new): The method of claim ~~53~~ wherein the luminescent bacteria is selected from the group consisting of *Photobacterium leiognathi*, *Photobacterium phosphoreum*, *Vibrio fischeri* (ATCC Acc. No. 7744) or *Vibrio harveyi* (ATCC Acc. No. 33843).

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Claim ⁵⁶~~55~~ (new): The method of claim ⁵⁵~~54~~ wherein the luminescent biological agent is *Vibrio harveyi* (ATCC Acc. No. 33843).

Claim ⁵⁷~~56~~ (new): The method of claim ⁵⁵~~54~~ wherein the luminescent biological agent is *Vibrio fischeri* (ATCC Acc. No. 7744).

Claim ⁵⁸~~57~~ (new): The method of claim ⁵³~~52~~ wherein the luminescent biological agent is selected from the group consisting of a luminescent bacteria, a luminescent fungi, a luminescent firefly extract, a luminescent anthozoan, a luminescent earthworm extract, a luminescent coelenterate extract and a luminescent crustacean.

Claim ⁵⁹~~58~~ (new): The method of claim ⁵³~~52~~ wherein the luminescent biological agent comprises a luminescent cell.

Claim ⁶⁰~~59~~ (new): The method of claim ⁵³~~52~~ wherein the luminescent biological agent comprises a genetically modified luminescent biological agent.

Claim ⁶¹~~60~~ (new): The method of claim ⁶⁰~~59~~ wherein the genetically modified luminescent biological agent comprises an organism genetically engineered to include a luciferase gene.

Claim ⁶²~~61~~ (new): The method of claim ⁵³~~52~~ wherein the separation phase matrix is high performance liquid chromatography and the test sample is a soluble sample.

Claim ⁶³~~62~~ (new): The method of claim ⁵³~~52~~ wherein the chemical identify of the separated toxic substance of the test sample is achieved by analyzing the corresponding inhibition region of the sample from the second set of serial aliquot volumes by nuclear mass spectrometry, infrared spectroscopy, mass spectroscopy or electron capture detection.

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Claim ⁶⁴63 (new): The method of claim ⁵³52 wherein determining the chemical identity further comprises photography.